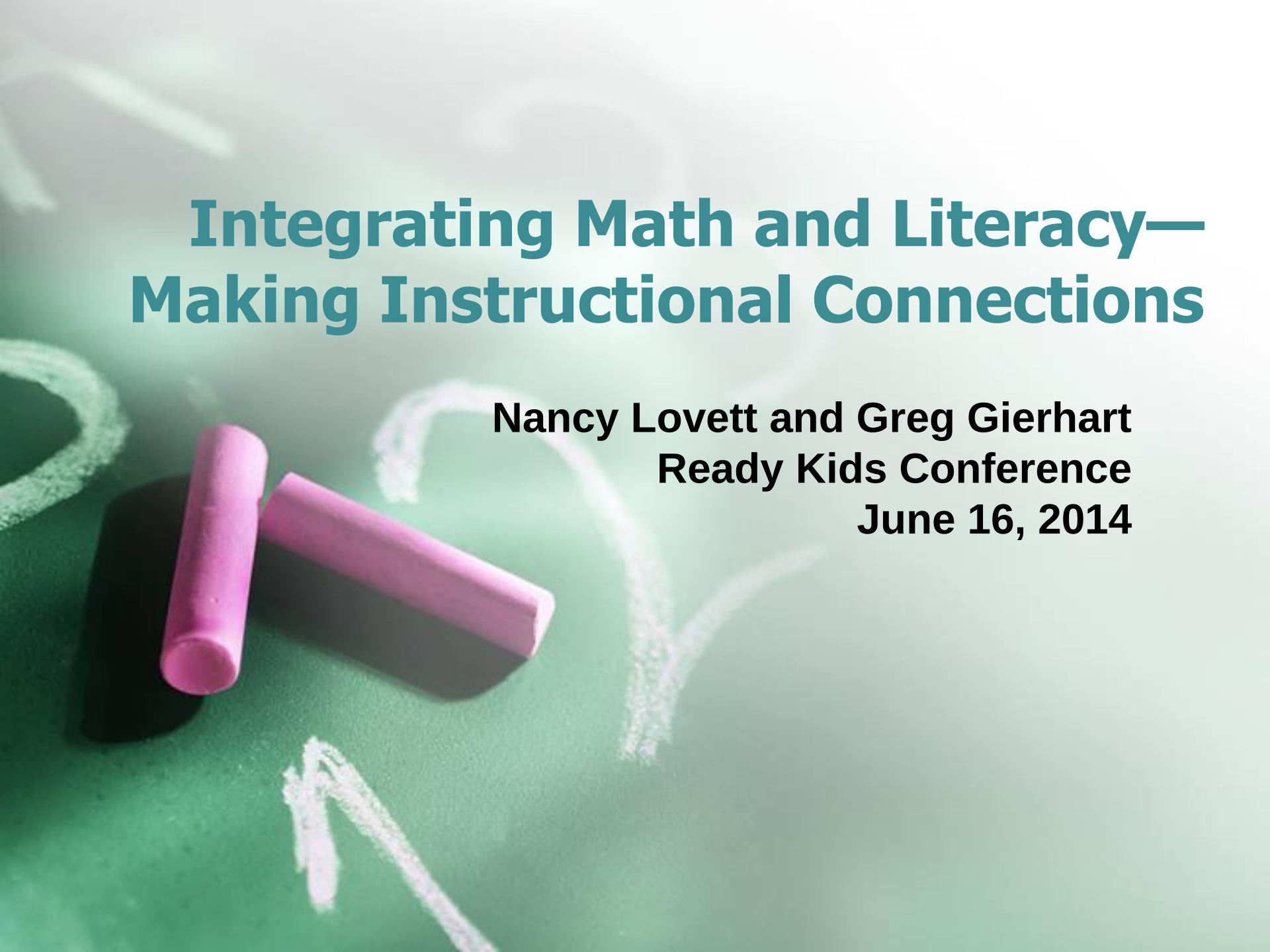

Integrating Math and Literacy—Making Instructional Connections

Nancy Lovett and Greg Gierhart

Ready Kids Conference

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What Do We Know About Math and Literacy?

- In small groups write down everything you know about literacy and mathematics

Why Focus on Math and Literacy

- Thinking Big
- Learning Big

Philosophy

- Why integrate?
- Big Outcomes

Research Says

"A meta-analysis of the results shows that early math skills have the greatest predictive power [of later achievement], followed by reading and then attention skills."

Duncan, Dowsett, et. al. (Nov. 2007).

Curriculum Consideration

- Opportunities for discovery and divergent learning versus worksheets and prepackaged convergent curriculum and instruction
- Brain functions optimally in a high challenge and low threat environment
- Brain likes novelty
- Brain works best in a social situation – construction of knowledge

Considerations Continued

- Manipulatives enhance learning—more neural connections between fingertips and brain than any other part of body.
- The environment must allow for “play” and exploration as well as inquiry.
- Environment must be appealing and stimulating—visually, tactile, options present with materials and ideas, allow for differences

Considerations Continued

- Classroom set up is critical
- Teachers respond to child's promptings and questions—develop study topics/projects accordingly

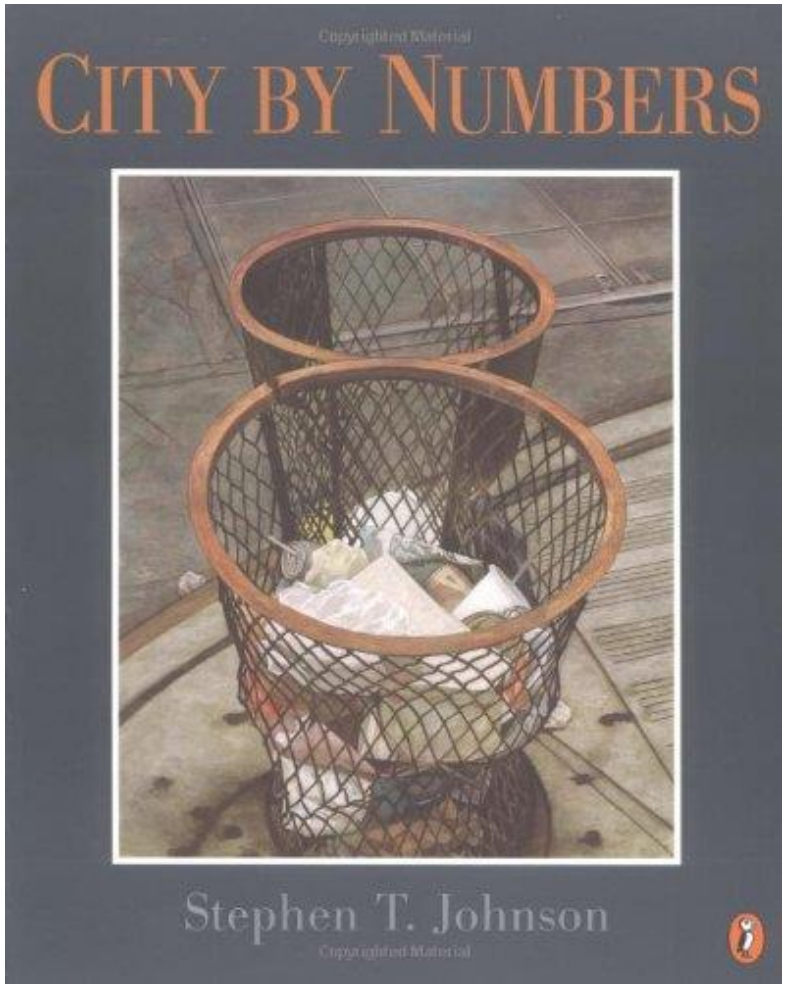
The Power of True Integration

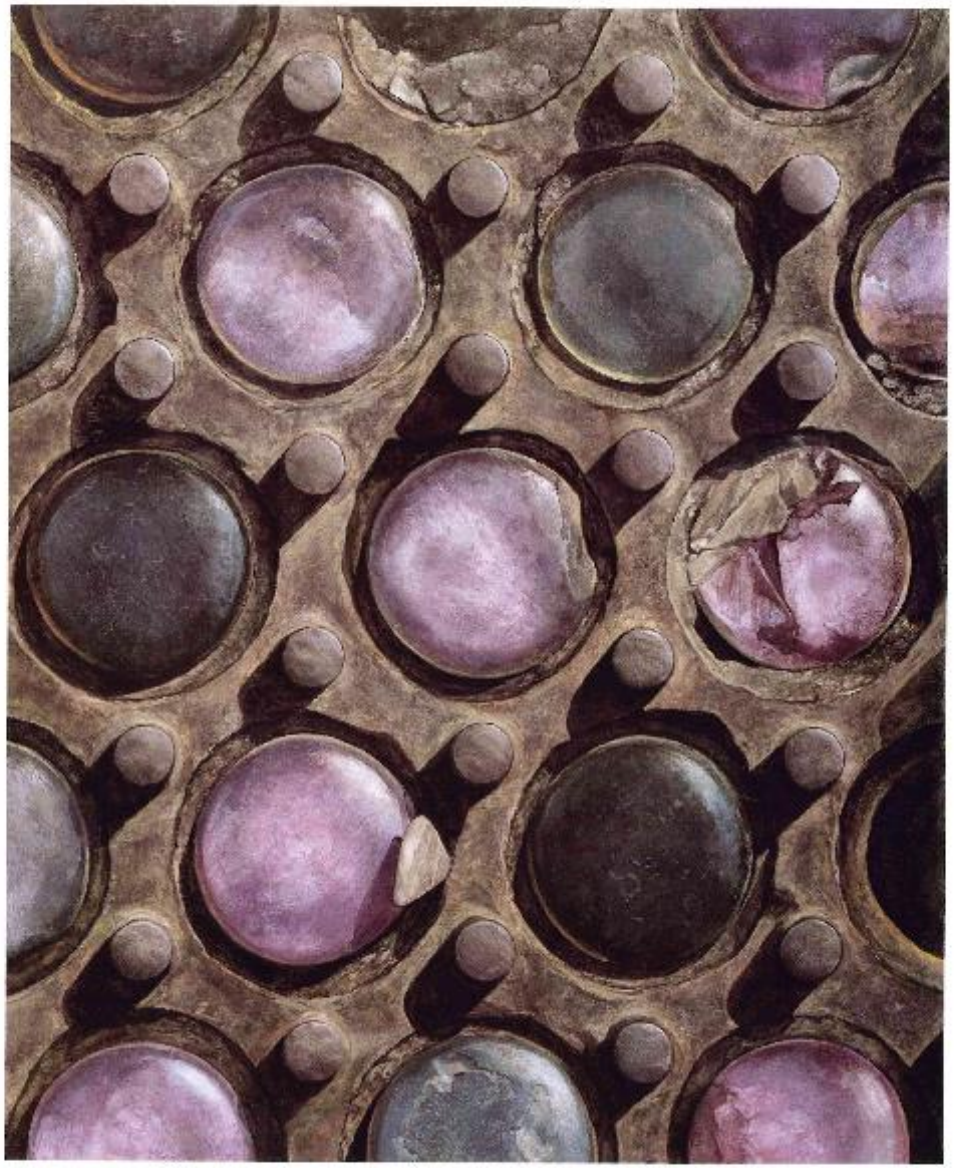
- Teachers should
  - *Ensure that taking action to support learning in one domain does not undermine learning in another domain.*
  - *Consider timing when integrating.*
  - *Take into consideration children's learning sequences and their present knowledge in each domain.*

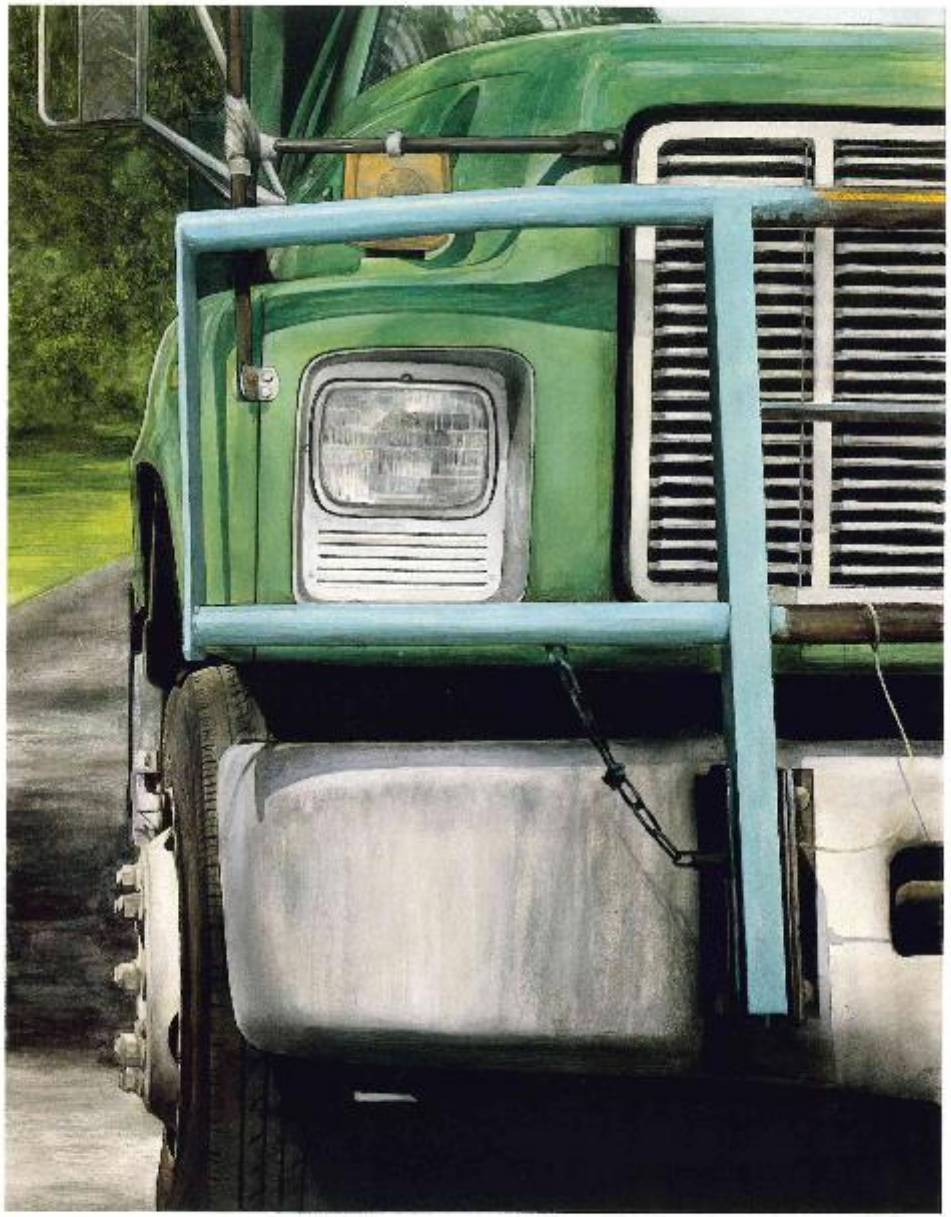
- *Think carefully about the emphasis to be given to each domain, depending on the learning goals and instructional context.*
- *Consider integrating not only within one instructional experience, but also across multiple and related instructional experiences.*
- *Think strategically about using multiple instructional contexts, such as whole group, small group or center time.*

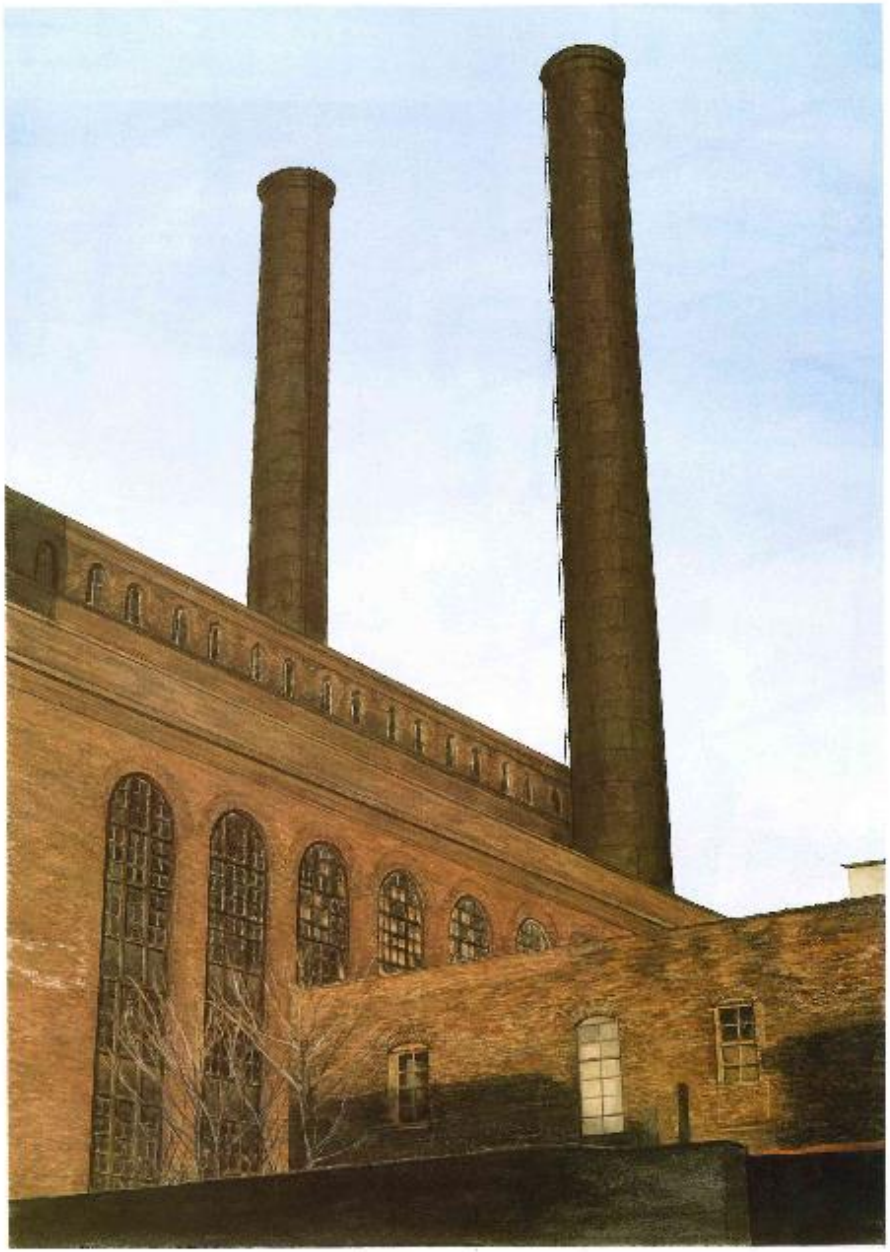
Math and Literacy are Everywhere

- What numbers do you see?









Let's Do Math through Literacy

Obstacle Course

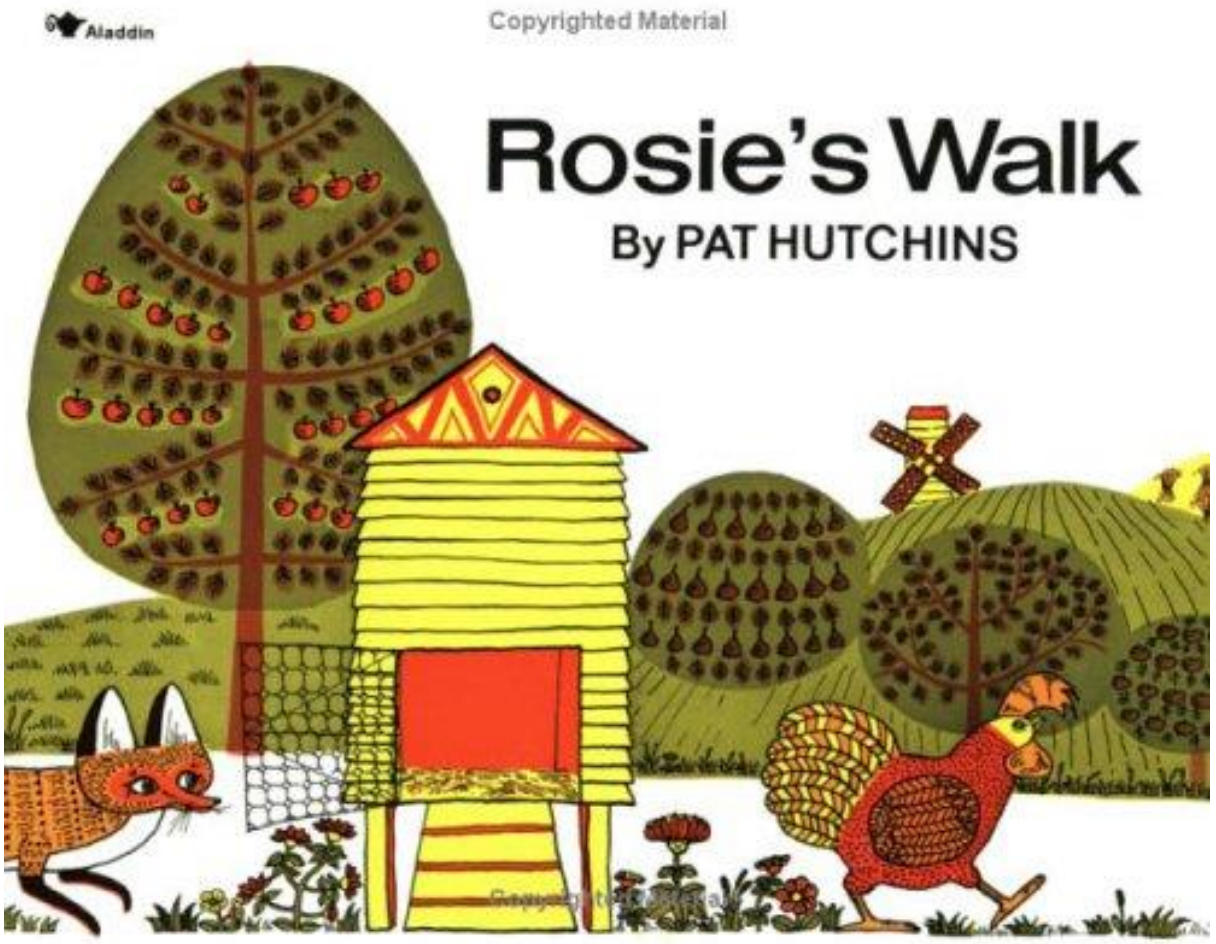
Adult Learning Experience

Can you guess what math/literacy content we are focusing on today?

What Positional Words are Found in Math?

- As an individual list as many as you can in the next 30 seconds.
- Share as a group.

Featured Book



Let's Talk about Math

- What's the connection between the obstacle course, drawing Rosie's path and spatial relationships?
- In what way are spatial relationships mathematical?

Draw a Map for Rosie's walk

Work on your own, using the grid paper. Rosie must follow a **closed** path that can be:

- Circular
- Rectangular
- Triangular

Activity for Rosie's Walk

- Find a partner from another table; do not show each other your maps during this activity, until the very end
- Partner A gives B verbal directions as B tries to draw A's map on another grid paper. Then B gives A directions.
- You may only use movements and direction terms.

Let's Talk Math

- How well did the map you drew from the directions reflect the one your partner drew and described?
- What did your or your partner do that might have made the task easier or more challenging?
- **Where is the math** in Rosie's Walk activities?

What About Geometry

Looking back at the Geometry is……statements, how has your understanding changed?

How might these terms make sense?

- Path – Shape – Perimeter
- Defining mathematical attributes of shapes?

Developmental Considerations

1. Movement in space is a basic and powerful experience that helps develop spatial sense.

   Children need to

   - *talk about*
   - *Plan*
   - *Organize such movements*

Developmental Considerations

2. Perspective-taking is just developing in many children of this age

Provide many experiences to show:

- *Things look different depending upon where the viewer is*
- *Words describe directions relative to a particular point of view*
- *Positional words often come in opposites over/under, up/down, left/right, near/far….*

Development Considerations

3. English language learners and children whose language is developing will need more support in understanding and using directional language, including:

- *Use of children's home language as much as possible*
- *Use of gestures*

Spatial Relationships

Big Ideas and Key Skills

- Relationships between objects and places can be described with mathematical precision
- Our own experiences of space and two dimensional representations of space reflect a specific point of view
- Spatial relationship can be visualized and manipulated mentally

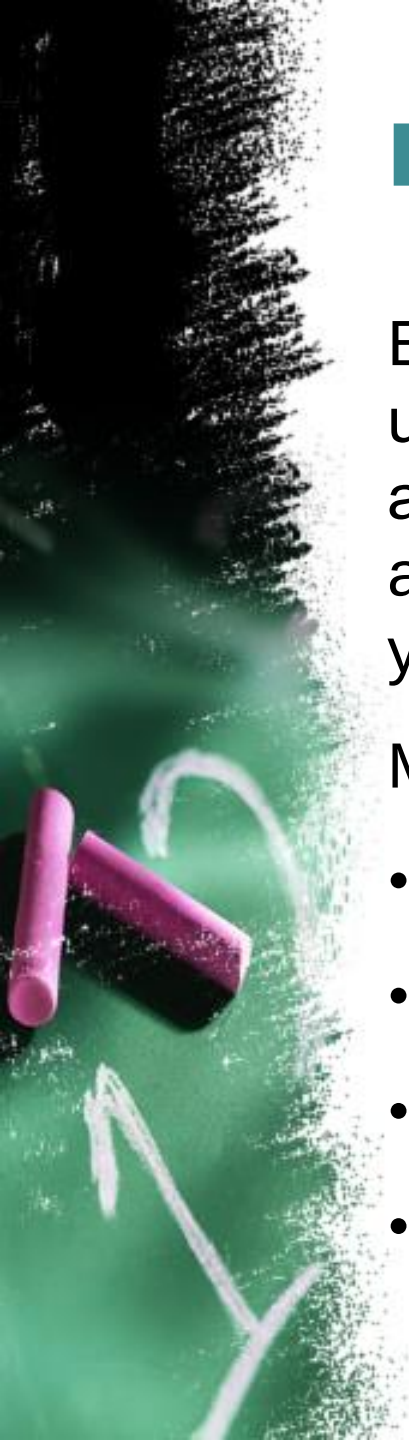
- Naming: Accurate/responses to and use of positional words (e.g., over, under, around, right, left, etc)
- Expressing measurement in appropriate units (e.g, Go 3 steps forward, Your house is 2 blocks away from mine.)
- Recognizing and expressing difference in spatial relationships depending on relative position (e.g, the car is to your left and my right, When I look at the tree from far away it looks smaller and then when I am close to it)
- Fluency in visualizing and manipulating spatial relationships (e.g., being able to mentally flip pieces to make them fit in a jigsaw puzzle.)

Rosie's Walk

1. How does the sequence of the activities support children to represent their understanding of spatial relationships in more than one way?
2. How does the teacher give ownership of the lesson to the children?
3. List the ways the teacher supports children's language development?
4. What evidence do you see that children are engaged and are actively constructing their own understanding?
5. How could you embed Rosie's Walk in centers throughout the classroom?

Additional Resources

- Games
- Books
- Discussions



Let's Talk Shapes

Each of you have a shape in your packet. Stand up, hide your shape and find a partner. Ask "yes" and "no" questions about the mathematical attributes of the shape to your partner and each of you figure out what shape the other has.

Mathematical Attributes include:

- Type of line (curved or straight)
- Number in lines
- Number and type of corners
- Relationship between length or angles (all the same, 2 are equal, other(s) are not, etc.

Shapes

Big Ideas

- Shapes can de defined and classified by their attributes
- The first faces of solid shapes (three dimensional shapes) are two dimensional shapes.
- Shapes can be combined and separated (composed and decomposed) to make new shapes

Key Skills

- Naming: knows mathematical attributes include straight, and/or curved lines, number of sides and angles (corners), and type of angles (square corners or not)
- Matching and Expressing measurement/comparison of shapes including that sides of a shape may have different length or that 2 triangles can be same type but that one can have longer sides.

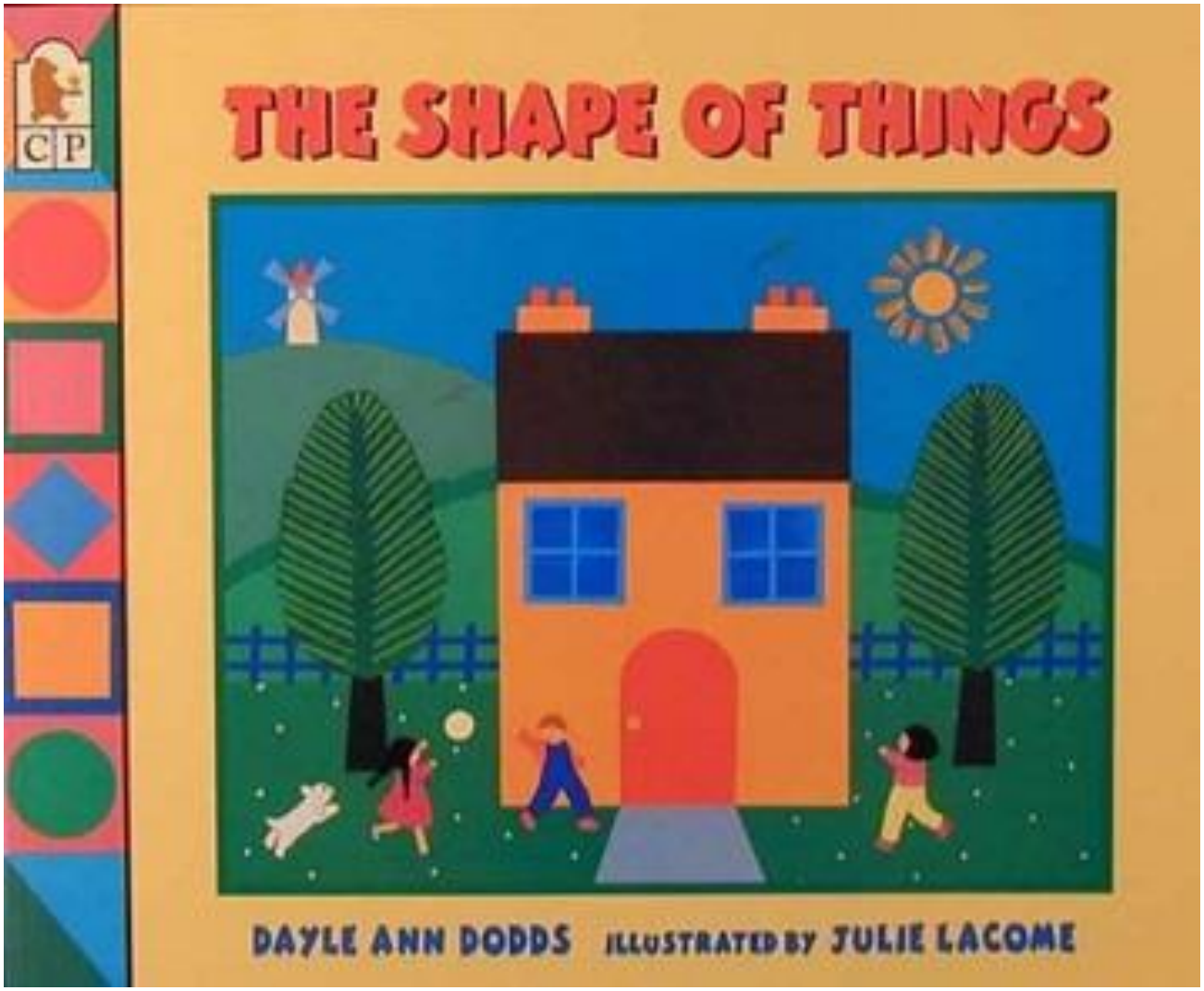
Video Clip

- What strategies do you see being used for reinforcing children's ability to determine shapes?

Feeling for Shapes

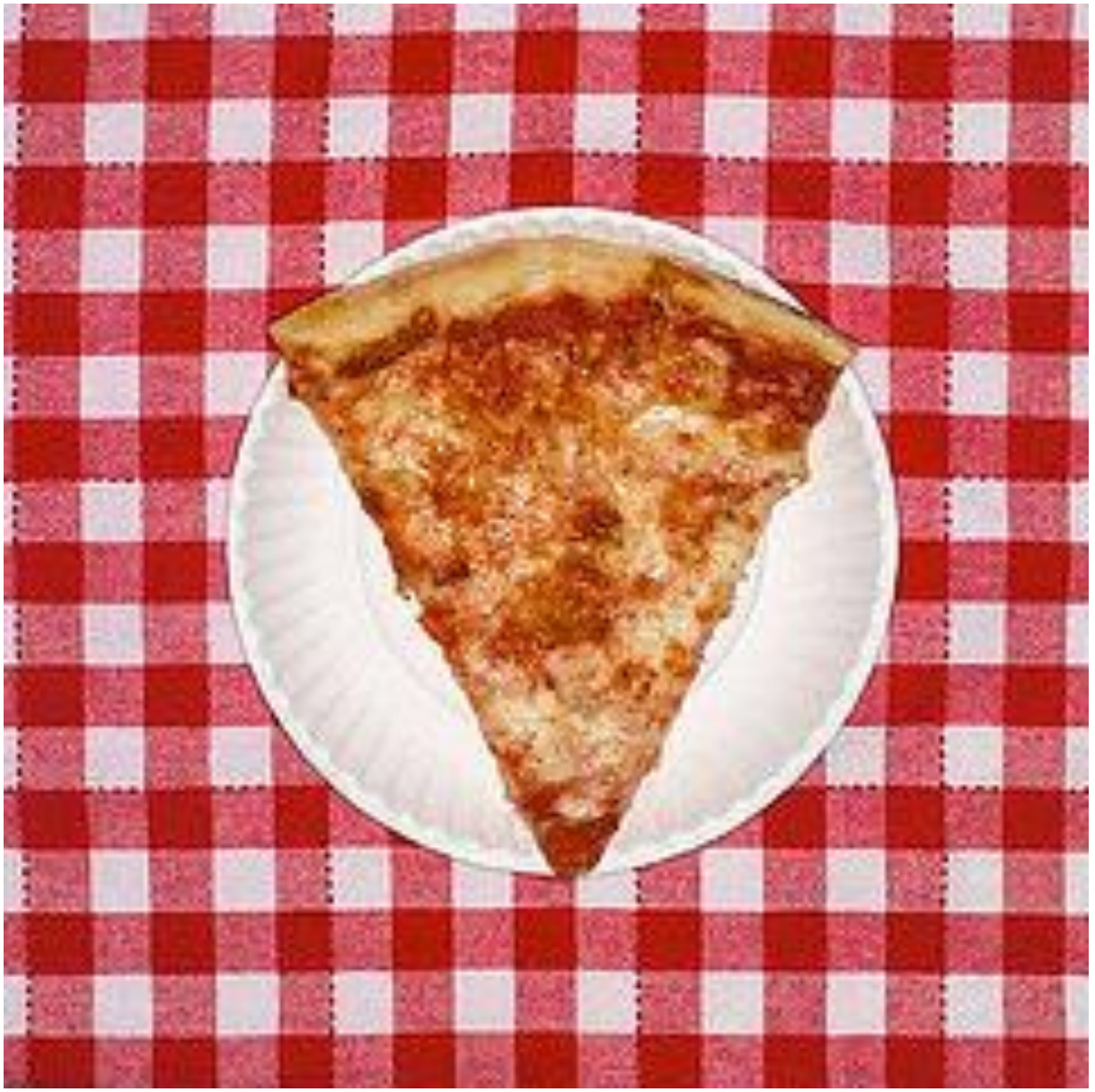
1. How does the mystery bag activity focus children's attention on the defining attributes of shapes, rather than on shape names?
2. How does the teacher give ownership and support the children's learning?
3. List the ways the teacher supports children's language development?
4. What evidence do you see that children are engaged and are actively constructing their own understanding?

Connecting Literacy and Shapes



The World is Filled with Shapes

How Many Shapes do you See?



Additional Resources

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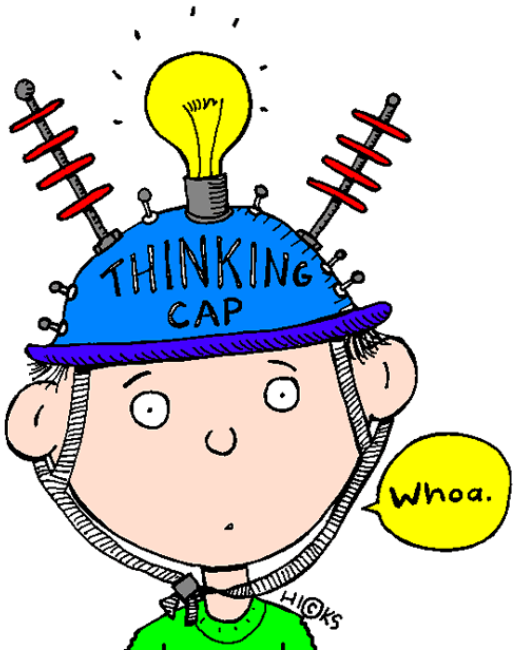
- Games
- Discussions

Big Ideas

- Math and literacy are strong predictors of later academic success.
- Math and literacy should not be taught in isolation but connected in real life situations/experiences.



For More Information

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